Professional Development and Evidence-based Curricula in 4K Literacy:

Recommendations for the Madison Metropolitan School District

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Purpose

The Madison Metropolitan School District (MMSD) is interested in exploring literacy curricula for students enrolled in their four-year-old kindergarten program ("4K"). The ideal curriculum will build literacy skills among early learners in an age-appropriate way, developing those skills largely through play-based activities. In addition to reviewing potential curricula, we considered various pedagogical strategies for improving literacy, independent from any specific curriculum MMSD might employ to appropriately and effectively support the development of student literacy in its 4K classrooms.

Scope

For this review, we:

1. Searched for published research on 4K literacy curricula with a focus on play and assembled a reading list of the relevant literature.
2. Conducted literature reviews of studies that assessed the effectiveness of various 4K curricula, privileging those with a focus on play. We preferred studies that relied on randomized control trials and that provided effect sizes measuring the difference in growth in literacy skills between intervention and control groups for each curriculum.
3. Constructed a spreadsheet of the curricula and pedagogical strategies that we reviewed and their various measurements of effectiveness.

Summary of Research

The Madison Metropolitan School District (MMSD) is interested in exploring best practices for literacy instruction at the 4K level. Building literacy skills among early learners is both critically important and pedagogically challenging in ways that differ from instructional strategies that are appropriate for older learners. Universal Pre-K programs have demonstrably positive effects on early learning and reduce inequities in academic skills (Cascio 2023; Ghirardi et al. 2023). However, both the short-run and long-run effects of early childhood education vary appreciably by programs and among students on average (Duncan et al. 2023) and even students within the same classroom (Weiland et al. 2023).

At a practical level, the components of early education most amenable to policy intervention (beyond offering a program) are the curricula and the pedagogical practices of instructors charged with implementing the curricula. To help inform decisions that will be made by Culleen Witthuhn, Director of Early Learning for MMSD, we reviewed the literature on curricula and pedagogical strategies to support early literacy development in pre-K and especially 4K settings. We searched academic journals, independent articles, review reports included in the U.S. Department of Education's What Works Clearinghouse, and other scholarship to find the best literacy curricula for 4K with a focus on play-based strategy. We found the literature on the subject fairly thin. In particular, there is a dearth of the scholarship on play-based curricula that promote literacy in 4K

students. We did find some promising evidence on curricula that are not necessarily play based, but appear to have appreciable positive effects on student literacy outcomes. We also found evidence for pedagogical strategies and a professional development model that contribute to enhanced growth in literacy,

The literature on preschool literacy curricula differentiates between comprehensive and domain-specific curricula. Comprehensive, or 'whole-child,' curricula, are designed to span over all of the domains of education while domain-specific curricula focus on each subject independently, offering a scope and sequence for the instruction and practice of these domain's skills. For example, a domain-specific curriculum would dedicate a portion of the day to student literacy skills, let's say for an hour in the morning. A comprehensive curriculum would not necessarily have a designated time for literacy instruction but instead would implement literacy development strategies throughout the school day amongst other domains and activities. Research on the use of domain-specific curricula relative to comprehensive curricula has demonstrated that more instructional time and quality is spent on each domain when using domain-specific curricula (McCormick, 2024). These differences contribute to the more positive effects of domain-specific curricula on literacy outcomes.

In this report, we focus on two curricula: Doors to Discovery and the World of Words, both domain-specific literacy curricula. Of the curricula we reviewed, these

demonstrated the strongest positive impacts on childhood literacy. The Doors to Discovery curriculum consists of eight thematic units and relies on a strategy of *shared literacy,* the idea that students and educators are both active participants in learning and maintaining literacy. Shared literacy is practiced, in this curriculum, by using interactive teaching techniques such as having students participate in story reading, thinking aloud activities, scaffolding, and cloze techniques where students fill in a missing word to a phrase provided by the educator (What Works Clearinghouse, 2013). The World of Words (or 'WOW') curriculum promotes literacy through texts with a focus on science and a "Talk Together, Read Together, and Reflect Together" model for implementation. This curriculum had the largest effect size[1] of any curriculum we reviewed, leading to average gains of 16 percentile ranks relative to students that did not receive the WOW curriculum. In addition to these curricula, we reviewed two pedagogical strategies, dialogic reading and retelling stories, that demonstrated positive impacts on early childhood literacy outcomes (What Works Clearinghouse, 2023). Finally, we included a review of the Seeds of Learning professional development model that is literacy-focused and play-based, while designed to be used with any curricula and has a large evidence base for early childhood literacy outcomes (Center for the Collaborative Classroom, 2024). The table

[1] An effect size is the difference in expected (average) outcomes for a treatment and control group expressed in standard deviation units. An effect size of 0.20, for example, indicates that students exposed to the curriculum under study, on average, experienced growth 20% of a standard deviation greater than students in the control group (who experienced a different curriculum). Based on a review of over 700 RCTs in educational research, Kraft (2020) suggests that an effect size of "less than 0.05 is small, 0.05 to less than 0.20 is medium, and 0.20 or greater is large." (247)

below summarizes the curricula, pedagogical strategies, and professional development model that we reviewed.

Table 1. Overview of Curricula, Pedagogical Strategies, and Professional Development Models That We Reviewed.

Approaches to enhancing literacy with evidence of positive impact

1. **Curricula**

Doors to Discovery:

Doors to Discovery is built upon eight thematic units designed to improve children's knowledge in specific literacy domains. For each unit, teachers are trained to use interactive reading strategies to engage students and educators in "shared literacy". The What Works Clearinghouse (WWC) conducted a review on three intervention studies on the Doors to Discovery curriculum, only one of which met the WWC standards of evidence without any reservations, a rating that WWC notes "provides the highest degree of confidence that the intervention caused the observed effect." (What Works Clearinghouse, 2022) That study demonstrated positive effects relative to the comparison group that used materials "loosely based" on the *Creative Curriculum* (What Works Clearinghouse 2013). The study found an average effect size of 0.48 across the print knowledge and oral language domains of early childhood literacy but did not

measure other domains of literacy. Other studies that did so failed to meet WWC standards, and thus we exclude them from this report. The Doors to Discovery curriculum costs $2,654 for the entire program, or $371 for each unit, and assessment materials are also available for purchase (What Works Clearinghouse, 2013).

World of Words (WOW):

The WOW curriculum, at its core, is focused on closing vocabulary gaps between students in preschools. This gap refers to the difference between students that have a larger and more complex vocabulary and students with a smaller and less complex vocabulary, which is usually characterized by quality of instruction and socioeconomic status (Hart et al, 1995). Motivated by research that examined the lasting positive impacts of focused vocabulary learning in early ages, the creators of the WOW curriculum wanted to address any gaps in this vocabulary learning (Marulis et al, 2010). Their strategy is to use science-based texts, texts with a focus on science topics, and interact with the texts using various evidence-based pedagogical strategies. The WOW curriculum includes six sets of materials that each include scripted teacher guides, five texts, fifteen picture cards, and a topic poster. Each topic is taught three to five days a week for a span of two to three weeks and the curriculum is provided, as of 2021, at a cost of $450 total. The WWC provided a review of six WOW intervention studies and

determined that, measured by multiple different assessments, the WOW curriculum improved children's language outcomes with an effect size of 0.43.

The WOW curriculum consists of three activities: 1. Talk Together, 2. Read Together, 3. Reflect Together. To talk together, teachers introduce a science topic and vocabulary words to students through various media such as picture cards, verbal interactions, and video content. These vocabulary words are then connected to the topic at hand and to previous content to contextualize the terms in the student's classroom experience. Then, the classroom transitions into the "Read Together" component, which is shared book reading that does not consist of traditional one-directional reading, but is an interactive practice. The shared reading references the vocabulary words introduced through talk and asks students to identify them, giving more information about those words to students, connecting those words back to other topics/concepts, and asking students questions throughout the reading so that they interact with the reading and with their teacher and classmates. Finally, the classroom reflects together, engaging in classroom discussion led by the teacher. Through discussion, teachers encourage students to use the new vocabulary words and the picture cards or other media to assist in comprehension and to use these new vocabulary words in new and unfamiliar contexts (What Works Clearinghouse, 2023).

2. Pedagogical Strategies and Professional Development

Dialogic Reading

Many of the curricula we reviewed used evidence-based pedagogical strategies in the training/coaching of educators. The most effective strategy we reviewed is Dialogic Reading, an instructional practice that involves educators including students in the reading process with techniques like adult readers asking open-ended questions, actively listening and promoting discussion around the story, and encouraging participation in the storytelling. Two studies we evaluated involved dialogic reading in their intervention groups and measured its effectiveness. The WWC also did a review of five different studies on dialogic reading and compiled their results into one review.

One study sought to understand how the positive effects of in-home one-on-one reading can be replicated in a classroom setting. The study involved four classroom teachers. Two classroom teachers were trained in dialogic reading and overall interactive reading strategies, while the other two were not and continued classroom activities as they usually did. The interactive reading strategies were then implemented in the intervention classrooms with a specific focus on relevant vocabulary words, announcing them and asking questions about them before and throughout the story. After implementing dialogic reading for 15 weeks, students were assessed on vocabulary development across three different tests. The results of assessment and teacher evaluation indicated improvements in the intervention students' test scores, comfortability asking teachers questions about the text and for vocabulary clarification,

and ability to connect story concepts to other classroom topics or other life experiences. The experimental group improved an average of 9.6% between the pretest and posttest while the control group scores decreased an average of 0.5%. The study concluded that, while one-on-one reading at home cannot be fully replicated in classroom settings, dialogic reading positively impacts student literacy outcomes (Wasik et al, 2001).

Another piece conducted two studies, one on the effectiveness of different play styles and another on the effectiveness of shared book reading, followed by play. The first study considered three different styles of play, administered by intervention specialists, with students grouped by play type. All students participated in group dialogic reading and one of the three different play styles. One group engaged in "Free Play," which is generally play without teacher intervention. Another group engaged in "Guided Play," which is where teachers are loosely involved in play activities and infuse target vocabulary into children's play. The final group engaged in "Directed Play," adult-led play activities where children have little to no opportunity to explore their interests. The children in the guided play and directed play groups performed considerably better than the children in the free-play group on the one-on-one assessments conducted with each student on both receptive and expressive measures of vocabulary.. Differences in the students' scores on these assessments between guided and directed play were not statistically significant. The guided play group answered correctly an average of 61% of the time on the receptive assessment compared to the free play group average of 54%.

The directed play group also performed better relative to free play, answering correctly an average of 60% of the time (Dickinson, 2018).

The second study found that shared book reading (functionally very similar to dialogic reading) followed by play improved student literacy. The authors compared literacy growth across three groups that participated in shared book reading: one where children participated in play following shared reading time, another where they viewed picture cards, and a third where they continued their normal classroom activities (control group). The play group scored an average of 3.3 times better on posttest than the pretest, tests administered before and after the intervention. The picture card group scored an average of 2.6 times their pretest average, while the control group only scored an average of 1.4 times their pretest average. Findings across both studies suggest that guided play following shared book reading or dialogic reading improves student literacy outcomes with statistical significance (Dickinson, 2018).

The WWC also reviewed multiple studies on dialogic reading. There were five studies that WWC reviewed that concluded that dialogic reading has positive effects on oral language and no discernable effects on phonological processing, including the first study we reviewed on dialogic reading by Wasik and Bond in 2001. Across these studies, for the oral language domain of literacy, they found the effect size to be 0.50 and 0.22 for the phonological processing domain (What Works Clearinghouse, 2007).

Retelling Stories

One article we reviewed found that the practice of students retelling stories improved literacy outcomes. This piece consisted of two studies on student story retelling. For each study, there were four classrooms in public schools with 15 students each, and each class was split into intervention and control groups. For study one, the pretest scores for each group were almost identical. Each group participated in the group story reading, were shown relevant picture cards, and participated in discussion around the story. The intervention group was asked to retell the story one-on-one as if they were telling the story to a friend that had never heard it, with the teacher only providing prompts such as, “what happened next,” while the control group was asked to draw a picture about the story during the same time. The students were then assessed within one half hour of the end of the activity. The group that drew pictures improved 12% and the group that retold the story improved 16%. For the second study, the setup was almost identical, except the students practiced story retelling once a week for eight weeks and then were assessed and the teachers gave more structured guidance to the story retelling, focusing on story structure. The intervention group improved 28%, while the control group only improved 9%. This piece demonstrates that story retelling is an effective method of improving students' literacy outcomes (Morrow, 1985).

3. Professional Development

SEEDS

We found one model for professional development, Seeds of Learning (SEEDS), that seemed to complement the curricula we reviewed above. SEEDS seeks to improve childhood literacy and, at the same time, students' social and emotional wellbeing. SEEDS intends to bridge literacy-based and strictly social-emotional learning curricula. The professional development requires that each educator participate in 27 training hours and 40 coaching hours where they learn strategies in play-based learning, focusing on sensitivity, encouragement, education, development of skills through doing, and self-image support. This model can be used with any curricula (Center for the Collaborative Classroom, 2024).

The SEEDS model has been the subject of multiple intervention studies. A 2017-2021 NORC study of Kidango preschool centers found that SEEDS advances student literacy outcomes by 5.6 months relative to the control group (NORC, 2020). The 2015–2017 Dual-Language Learners Data Snapshot demonstrated substantial positive impacts as well, with effect sizes of 0.75 for Spanish speakers and 0.70 for English speakers (First Five Santa Clara County, 2017). These effect sizes are consistent with those reported in the 2015 National and Community Service Outcome Evaluation and 2013 Progress Report, which were 0.60 (National and Community Service Outcome Evaluation, 2015).

Conclusion

We reviewed literature on the best practices in literacy curriculum for 4k students. That literature is relatively thin; we found few persuasive studies that could speak to the effects of curricula on literacy outcomes. We found strong evidence for two literacy curricula that demonstrated positive improvements in literacy for preschool learners: Doors to Discovery and World of Words. The Doors to Discovery curriculum is built upon eight thematic units that each focus on a specific domain of literacy. Across several high-quality intervention studies, the curriculum has an average effect size of 0.27 for oral language and 0.39 (but not statistically significant) for print knowledge. The World of Words curriculum uses scripted teacher guides and science-based texts to educate students within different domains of literacy and was determined, based on six intervention studies, to have an effect size of 0.43 on language. In our review, we also found two pedagogical strategies and one professional development model that demonstrated positive effects on student literacy outcomes. The pedagogical practice of Dialogic Reading, across multiple studies, produced gains in preschool literacy. This strategy involves educators including students in the reading process utilizing techniques like adult readers asking open-ended questions, actively listening and promoting discussion around the story, and encouraging participation in the storytelling. Some of

the Dialogic Reading interventions also found that literacy outcomes improved the most when “guided” and “directed” play were used.

The other pedagogical strategy that we included in our recommendation is Story Retelling, a strategy in which students retell stories they were read by teachers as if they were telling the story to a friend who had never heard the story. Both of these pedagogical strategies demonstrated substantial positive impacts on student literacy outcomes. In addition, we reviewed the SEEDS professional development model that provides teacher training on pedagogy on literacy and other educational domains as well as social-emotional wellbeing amongst teachers and students with a focus on play-based activities. Our review has informed our recommendations of two curricula, two pedagogical strategies, and one professional development model to the MMSD to improve 4k student literacy outcomes.

Works Cited

Cascio, E. U. (2023). Does Universal Preschool Hit the Target? *Journal of Human Resources*, *58*(1), 1.

Center for the Collaborative Classroom. (2024, August 1). *Seeds of learning*. Collaborative Classroom. https://www.collaborativeclassroom.org/professional-learning/seeds-of-learning/

Chicago, N. a. t. U. o. (2020). SEEDS of Learning Program Evaluation. In: NORC at the University of Chicago.

County, F. F. S. C. (2017). SEEDS of Learning Results in FY 2015-16 and 2016-17. In: Applied Survey Research.

Duncan, R. J., Anderson, K. L., King, Y. A., Finders, J. K., Schmitt, S. A., & Purpura, D. J. (2023). Predictors of preschool language environments and their relations to children's vocabulary. *Infant and Child Development*, *32*(1), e2381.

Ghirardi, G., Baier, T., Kleinert, C., & Triventi, M. (2023). Is early formal childcare an equalizer? How attending childcare and education centres affects children's cognitive and socio-emotional skills in Germany. *39*(5), 692-707.

Hart, B., & Risley, T. (1995). Meaningful Differences in the Everyday Experience of Young American Children. In: Paul H Brookes Publishing.

Kraft, M. A. (2020). Interpreting Effect Sizes of Education Interventions. Educational Researcher, 49(4), 241-253.

Markovitz, C. E., Hernandez, M. W., Hedberg, E. C., & Silberglitt, B. (2015). Outcome Evaluation of the Minnesota Reading Corps PreK Program. In: The Corporation for National and Community Service.

Marulis, L. M., & Neuman, S. B. (2010). The Effects of Vocabulary Intervention on Young Children's Word Learning: A Meta-Analysis. *Review of Educational Research*, *80*(3), 300-335.

McCormick, M. (2024). Perspectives: Latest Debate on Pre-K Ignores the Impact of High-Quality Curricula and Aligned PD In: Overdeck Family Foundation.

Morrow, L. M. C. F. p. d. M. (1985). Retelling Stories: A Strategy for Improving Young Children's Comprehension, Concept of Story Structure, and Oral Language Complexity. *The Elementary School Journal*, *85*(5), 647-661.

Toub, T. S., Hassinger-Das, B., Nesbitt, K. T., Ilgaz, H., Weisberg, D. S., Hirsh-Pasek, K.,...Dickinson, D. K. (2018). The language of play: Developing preschool vocabulary through play following shared book-reading. *45*, 1-17.

Wasik, B., & Bond, M. (2001). Beyond the Pages of a Book: Interactive Book Reading and Language Development in Preschool Classrooms. *93*, 243-250.

Weiland, C., Moffett, L., Rosada, P. G., Weissman, A., Zhang, K., Maier, M.,...Sachs, J. (2023). Learning experiences vary across young children in the same classroom: evidence from the individualizing student instruction measure in the Boston Public Schools. *63*, 313-326.

What Works Clearinghouse, U.S. Department of Education, Institute of Education Sciences. (2007, February). Intervention Report: Dialogic Reading. Retrieved from https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/WWC_Dialogic_Reading_020807.pdf

What Works Clearinghouse, U.S. Department of Education, Institute of Education Sciences. (2013, June). Early Childhood Education intervention report: Doors to Discovery™. Retrieved from https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/wwc_doors_062513.pdf

What Works Clearinghouse, Institute of Education Sciences, U.S. Department of Education. (2023, August). World of Words. https://ies.ed.gov/ncee/WWC/Docs/InterventionReports/WWC_world-of-words_report.pdf

What Works Clearinghouse, U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance (NCEE). (2022) "What Works Clearinghouse Procedures and Standards Handbook, Version 5.0 " Washington, D.C.

	Effect Size	Improvement In	Cost	Play-Based?	Reviewed by WV	Description
Open Court Reading (OCR)	0.16	-	-	No	No	Three component curriculum: Preparing to Read; Reading and Responding; and Language Arts. Not incredibly play-based, but good literacy development evidence. Teachers are given scripted lesson plans and assessment packages following a unit style, each unit has a theme and lasts 6 weeks. Also includes a specific pacing plan for teachers to follow. SRA/McGraw Hill consultants train teachers for 2-3 day summer workshops and follow-up visits to the schools and/or with the teachers to ensure grasp of OCR.
Tools of the Mind	*0.05*	-	$300 for materia	Yes	No	Focused on developing students underlying cognitive skills, especially self-regulation, simultaneously with academic skills, through play. "Basic principles of the curriculum include: (1) children construct their own knowledge; (2) development cannot be separated from its social context; (3) learning can lead development; and (4) language plays a central role in mental development". Includes pedagogical methods like buddy reading, circle time, large and small group games. Structured and guided play, not designed to simply "let children play".
World of Words (WOW)	0.43	16	$450, $75 per te	No	Yes	Built by three components, not play-based but effects of the curriculum on early literacy development are large. 1. "Talk Together", Introducing science topic and general vocabulary words and their definitions. Usually using video clips or picture cards. Connecting words to the topic and to previously learned concepts. 2. "Read Together" Shared book reading. Each science book set includes 3 types of text: Predictable Text: rhyming structure, repetition, good for remembering the vocab words, Narrative Text: storybooks that contain characters, traits, temporal connections, Informational Text: designed to give scientific information about the topic. Teachers used engaging reading strategies, interacting with the students and allowing them to interact with the text. For predictable text, teachers asked students questions about the vocabulary words they've been learning, encouraging them to use these words. For narrative text, teachers highlighted specific words, maybe gave more information about them, and/or linked it to a concept in the book. For informational text, teachers read a few pages at a time, stopping to connect words and concepts to other texts or activities. 3. "Reflect Together", Engaged the students in a discussion led by teacher questions. Encourage students to use the new words they learned, using the picture cards/digital media for reference when they need help remembering. Asked challenging questions to encourage students to consider these new words in new, unfamiliar contexts.
Doors to Discovery	*0.27*	11	$2,654.25 for en	Yes	Yes	Doors to Discovery uses eight thematic units to develop early childhood literacy skills. Each unit is available as a kit that includes teacher resources. 8 thematic units: Backyard Detectives; Build it Big!; Discovery Street; Healthy Me!; New Places, New Faces; Our Water Wonderland; Tabby Tiger's Diner; and Vroom! Vroom! Multiple teaching techniques used in implementation: Cloze techniques: teacher gives a phrase that is missing a key word and the student must fill it in, Thinking aloud activities, Student story retelling, Scaffolding. Concept of 'shared literacy' where adults and children both actively participate in building literacy.
Dialogic Reading (Pedagogical Strategy)	0.36	14	-	No	Yes	Teaching strategy: Teacher and student switch roles so that the student gains experience as the storyteller, with the adult questioning and acting as an active listener.
Dialogic Reading and Sound Foundations (Pedago	0.27	10	-	No	Yes	Sound Foundations, a literacy curriculum designed to teach phonological awareness to preliterate children, focuses exclusively on phoneme identity (that is, different words can start and end with the same sound). It works from the principle that phonemic awareness is necessary but not sufficient to reading, which depends on the alphabetic principle. Combination with dialogic reading strategy.
SEEDS (Professional Development)	0.53	-	-	Yes	No	SEEDS of Learning is another curriculum program, but is Adult-focused. Designed to train, coach, and professionally develop adult caregivers for preschoolers. Specifically in these domains: oral language, emergent literacy, and social and emotional skills.
Red Light Purple Light	-	-	-	Yes	No	Classroom intervention focusing on self-regulation; Circle time, Movement games, Music. Designed to "systematically increase cognitive complexity over 16 sessions". Research shows that self regulation skills translate to academic development in math and literacy areas. Shown to improve student ability and has shown significant improvement in previous intervention studies. Present study focuses on three underlying executive function (EF) cognitive processes: Working memory (Ability to maintain and manipulate information), Cognitive flexibility (Sustain focus and adapt to changing goals), and Inhibitory control (To stop a dominant response for a more appropriate one). Evidence suggests that these three are very important for early childhood academic development. 2 sessions a week for 8 weeks, large group format, 15-20 minutes, 5 games, one game per session, repeated over sessions with varying complexity.

*In the Effect Size column: Bold text represent statistical significance in the study while Italics represent lack of statistical significance.